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【添付書類】

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⑫公開実用新案公報（Ｕ）　平3－43174

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(54)考案の名称　密封装置

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㉒出　願　平1(1989)9月1日

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(57)実用新案登録請求の範囲

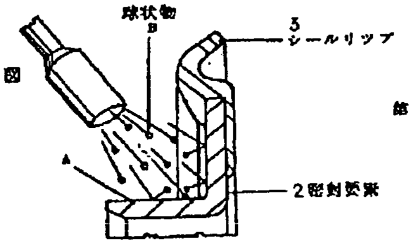
回転部材１ａと固定部材１ｂとに嵌合装着される複数の密封要素２，２′の組合せからなつた密封装置であつて、前記密封要素２に弾性体からなるシールリップ３を設けて対向した密封要素２′に摺接せしめ、このシールリップ３が接触するその摺動面Ａに球状物Ｂを噴出して凹凸面を形成したことを特徴とする密封装置。

図面の簡単な説明

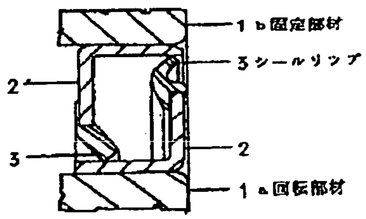
第１図は本考案の密封装置を形成している一実施例を表した断面図である。第２図は本考案の密封装置の摺動部を表した拡大部分断面図である。第３図は組み合わせて形成する密封装置を示した断面図である。

Ａ……摺動面、Ｂ……球状物、１ａ……回転部材、１ｂ……固定部材、２……密封要素、３……シールリップ。

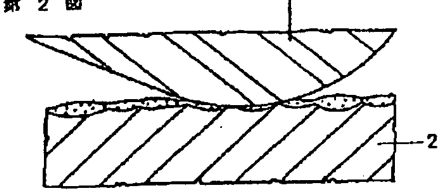
第１図



第３図



第２図



実用新案登録願（B）

平成1年9月1日

（11000円）

特許庁長官　吉田文毅殿

1. 考案の名称　密封装置

2. 請求項の数　1

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5. 添付書類の目録

(1) 明細書　1通

(2) 図面　1通

(3) 願書副本　1通

(4) 譲渡証書　1通

3

明細書

1．考案の名称

密封装置

2．実用新案登録請求の範囲

回転部材１ａと固定部材１ｂとに嵌合装着される複数の密封要素２・２′の組合せからなった密封装置であって：前記密封要素２に弾性体からなるシールリップ３を設けて対向した密封要素２′に摺接せしめ、このシールリップ３が接触するその摺動面Ａに球状物Ｂを噴出して凹凸面を形成したことを特徴とする密封装置。

3．考案の詳細な説明

［産業上の利用分野］

本考案は密封装置の密封性能改良に関し、さらに具体的には密封装置の摺動性と密封耐久性を向上せしめる形状の改良に関するものである。

［従来の技術］

従来、複数の密封要素を組み合わせその内外に弾性体からなるシールリップを配設した密封装置が開発実施されており、昨今では前記シールリップを表面状態の比較的安定した相手側の密封要素に直接接触せしめて密封作用を働かせしめる構造が知られるようになった。

この構造は、図面を参照しつつ詳述すると、第3図に示すように、金属などで形成される密封要素２を互いの部材が対向するように組合せ、これに配置したシールリップ３をその軸方向あるいは径方向に接触せしめて密封を図る構造が一般的に実施されている組合せ型の密封構造である。

［考案が解決しようとする課題］

しかしながら、前記シールリップ３が摺接する密封要素２の摺動面Ａはその密封性能を大きく左右するもので、該摺動面Ａの表面あらさが小さ過ぎると潤滑材である油膜ができにくいため回転摩擦により発熱しシールリップ３が硬化したり焼き付けを起こして密封不良を発生させ、逆に該摺動面Ａの表面あらさが大き過ぎると潤滑材の漏れや

5

シールリップ３の摩耗を早めるなどの欠点を引き起こしてしまう。

　すなわち、密封性を保つにはシールリップ３の接触する摺動面Ａがある一定範囲の空隙を有する適度のあらさを必要とする。この求められるあらさ範囲は、例えば回転用シールの場合最大あらさRmax ０．７Ｓ～３．０Ｓ程度、往復運動用シールの場合は０．５Ｓ～１．７Ｓ程度が密封するに最も好ましい範囲であろう。従って、密封装置の摺動面Ａに前記のような適度のあらさを持たしめて良好な油膜を保ち長期間変わらぬ強い密封力を発揮させることが肝要である。

　本考案はこのようなことに鑑み、密封性が高く量産性に優れた密封装置を提供することを目的としている。

［課題を解決するための手段］

　本考案は、第３図に示すように回転部材１ａと固定部材１ｂとにそれぞれ嵌合装着される複数の密封要素２・２′の組合せからなった密封装置であって：前記密封要素２に合成ゴムあるいは合成

6

樹脂等の弾性体からなるシールリップ３を設けて対向した密封要素２′に摺接せしめ、このシールリップ３が接触する摺動面Ａに、第１図のごとく、適度の粒度を有する球状物Ｂを噴出して所望するあらさの凹凸面を形成したことを特徴としている。

［作用］

上記の構造によって次に示す優れた作用を得られた。

すなわち、第１図が示すように、シールリップ３の接触する摺動面Ａに適度の粒度を有する球状物Ｂを噴射すると、該球状物Ｂの各々がその表面をたたき前記摺動面Ａはこの衝撃に負け表面の膜を徐々に破壊して凹凸形状を形成する。

このような凹凸が形成された摺動面Ａを持つ密封要素２をそれぞれ組みつけて密封要素を構成すると、シールリップ３の接触部は、第２図に示すように適度の間隙部分を多数箇所保持するものとなり、該密封装置を装着しての運転時、前記凹凸部分の底部及び凸部付近に適量の潤滑材が膜とな

って溜り、該摺動部はバランスの良いなじみを実現して良好な摺動性と強い密封性の互いに相反する作用を発揮するものとなる。

［実施例］

本考案を実施するに、噴射させる球状物Ｂは粒子の硬度及び寸法さらには粒子量あるいは噴射時間などを調節することにより所望のあらさと多量の処理を行うことが可能であり、また第３図のような、複数のシールリップ３が互いの密封要素２、２′に接触する密封装置の場合、その凹凸処理を複数の密封要素２、２′の両摺動面Ａに施して組み合わせればさらに良好な密封性能が得られるものとなる。

［考案の効果］

この球状物Ｂの噴射は、弾性体からなるシールリップ３の固着に必要な接着剤層を完全に除去することができるので該接着剤層に影響されることのない密封するに適した表面を形成できる。また、該噴射の衝撃により金属からなる密封要素２の表面の金属結晶が微細化し高硬度となって対摩耗

8

性が向上する。

前記凹凸形状の形成された摺動面Aは、潤滑材が保持され易く撥水性を大きく減少させることができるので常時適度に潤った表面を提供して摺動部の潤滑を良好に行わしめる。

4．図面の簡単な説明

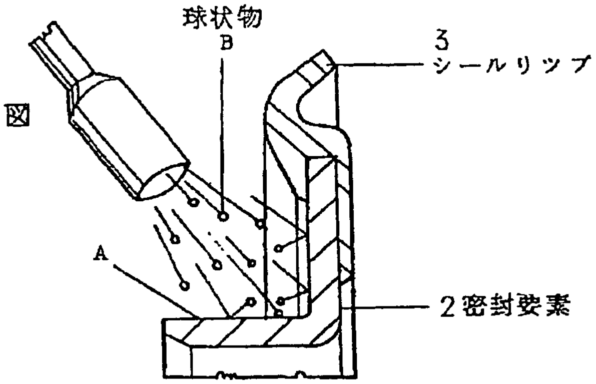
第1図は本考案の密封装置を形成している一実施例を表した断面図である。第2図は本考案の密封装置の摺動部を表した拡大部分断面図である。第3図は組み合わせて形成する密封装置を示した断面図である。

A…摺動面　B…球状物

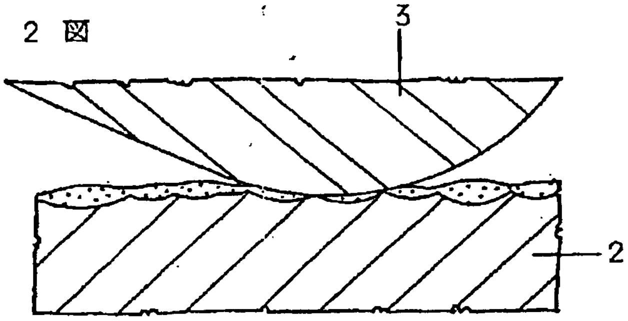
1a…回転部材　1b…固定部材　2…密封要素　3…シールリップ

実用新案登録出願人　内山工業株式会社

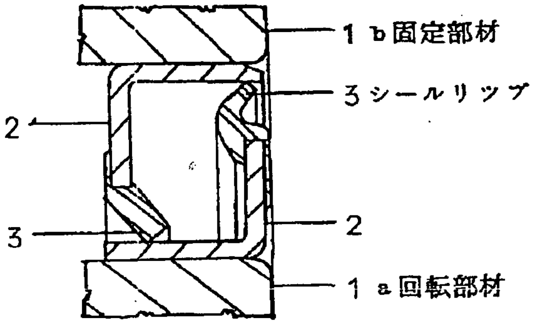
第 1 図



第 2 図



第 3 図



実用新案登録出願人　内山工業株式会社

Unexamined Utility Model Hei 3-43174

(19) Japanese Patent Office
(12) Publication of Unexamined Utility Model Application
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(43) Date of Disclosure: 1991.04.23
(51) Int.Cl.5 F16J 15/32
Identification Symbol: 311 Z K

Docked Number: 7523－3 J′, 7523－3 J

Number of Devisal: 1
Total Pages:

(21) Application Number: Hei 1－103230

(22) Date of Application: 1989. 09. 01
(54) Title of the Devisal; TIGHT SEAL DEVICE
(72) Creator: Takeshi Kageyama
338, Enami, Okayama-Shi Okayama-Ken
c/o Uchiyama Manufacturing Corp.

(71) Applicant:
Uchiyama Manufacturing Corp.
338, Enami, Okayama-Shi Okayama-Ken

1. TITLE OF THE DEVISAL

Tight Seal Device

2. Scope of Utility Model Claims:

A tight seal device comprising a combination of a plurality of the tight seal elements 2 and 2' which are fitted to and mounted on a rotating parts 1a and a fixed parts 1b, the tight seal device being characterized in that said tight seal element 2 is provided with a seal lip 3 and let come into sliding contact with the opposed tight seal element 2' and that a rugged surface is formed by spraying spherical pieces B to a slide. surface A which is to come into contact with this seal lip 3.

3. Detailed Description of The Devisal

[Industrial Field of Application]

The present devisal is related to the improvement of tight sealing capability of a tight seal device, and specifically related to the improvement of a profile for improving the slide performance and the tight sealing endurance of a tight seal device.

[Prior Art Technique]

In the prior art technique, tight seal devices have been developed and implemented in which a plurality of tight seal elements are combined with seal lips of a resilient member provided inside and outside thereof. So far, it has been known that a sealing action is enabled by the direct contact of said seal lip with a tight seal element of the opposition side whose surface condition is relatively stable.

Specifically explaining with reference to a drawing, this structure is implemented by combining tight seal elements 2 made of a metal and the like in order that a counterpart member thereof are arranged opposed to each other as illustrated in Fig. 1 to provide a combination type tight seal structure, which has been generally utilized, in which a seal lip 3 is arranged in contact with

the counterpart member in the axial direction or in the radial direction to tightly seal the structure.

[Problems to be Solved by The Devisal]

However, the tight sealing capability of said seal lip 3 is largely affected by the slide surface A of the tight seal element 2 being in slide contact with said seal lip 3. When the surface roughness of the slide surface A is too small, an oil film as a lubricating agent is hardly formed so that heat is generated due to the rotating friction to harden or stick the seal lip, resulting in imperfect sealing. Contrary to this, when the surface roughness of the slide surface A is too large, there are other drawbacks such as the leakage of the lubricating agent, the acceleration of the wear of the seal lip 3 and so forth.

Namely, in order to secure a tight sealing capability, it is needed to have an appropriate roughness of the slide surface A being in contact with the seal lip 3 to provide a clearance within a certain range. For example, the roughness as needed is 0.7S to 3.0S or thereabout in maximum roughness Rmax in the case of a seal for rotating motion, and 0.5S to 1.7S in the case of a seal for reciprocating motion, as most preferable ranges for the purpose of tight sealing. Accordingly, it is of primary importance to provide the slide surface A of a tight seal device with an appropriate roughness on which an proper oil film is surely formed and therefore a tight sealing power is maintained for a long period.

It is therefore an object of the present devisal to provide a tight seal device having a high tight sealing capability and a high mass-productivity.

[Measures to Solve the Problems]

The present devisal is characterized by a tight seal device comprising a combination of a plurality of the tight seal elements 2 and 2' which are fitted to and mounted on a rotating parts 1a and a fixed parts 1b, in which said tight seal element 2 is provided with a seal lip 3 and let

come into sliding contact with the opposed tight seal element 2' and that a rugged surface is formed by spraying spherical pieces B to a slide surface A which is to come into contact with this seal lip 3.

[Action]

The following excellent action was obtained by the above described structure.

Namely, as illustrated in Fig. 1, when spherical pieces B having an appropriate grain size are sprayed to a slide surface A to be arranged in contact with the seal lip 3, each of the spherical pieces B collides with the surface thereof, and then the surface film of said slide surface A is gradually broken due to this bombardment to form a rugged structure.

In the case where a tight seal element is assembled by combining tight seal elements 2 each of which is provided with a slide surface A having such a rugged structure, there are formed a number of appropriate clearance locations in the surface to be come into contact with the seal lip 3 as illustrated in Fig. 2 and therefore, when driving with the tight seal device in use, a proper quantity of a lubricating agent tends to linger in the vicinity of and the bottom of the rugged structure in the form of a film to realize a balanced fitness and meet the clashing requirements, i.e., a good sliding performance and a tight sealing structure.

[EMBODIMENTS]

By means of the present devisal, it is possible to provide a desired roughness at high throughput by adjusting the degree of hardness, the size, the particle amount and the spraying period of spherical pieces B to be sprayed. Also, in the case where a plurality of seal lips 3 are combined with their tight seal elements 2 and 2' which come into contact with each other as illustrated in Fig. 3, a furthermore improved tight sealing capability can be achieved by giving the rugged surface treatment to

both slide surfaces A of the plurality of the tight seal elements 2 and 2' and combining them.

[Effects of the devisal]

The jet of this spherical pieces B is used to completely remove an adhesive layer for use in fixing the seal lip 3 made of a resilient member and therefore it is possible to form a surface suitable for tight sealing free from the adhesive layer. Also, the abrasion resistance is improved while the metallic crystals at the surface of the tight seal element 2 made of a metal are finely grained to achieve a high degree of hardness by the bombardment during the particle blast.

Since the slide surface A provided with said rugged structure serves to maintain a lubricating agent thereon and greatly lessen the water-shedding quality, it is possible to constantly provide a lubricant for the surface and suitably perform the lubrication of the slide mechanism.

4. Brief Description of Drawings:

Fig. 1 is a cross sectional view showing an embodiment of the tight seal device in accordance with the present devisal. Fig. 2 is a partially expanded cross sectional view showing a sliding location of the tight seal device in accordance with the present devisal. Fig. 3 is a cross sectional view showing a tight seal device formed by combination.

A ...slide surface, B ...spherical pieces,

1a ... rotating parts, 1b ... fixed parts, 2 ... tight seal element, 3 ... seal lip

Applicant for a utility model registration:
Uchiyama Manufacturing Corp.

Fig. 1

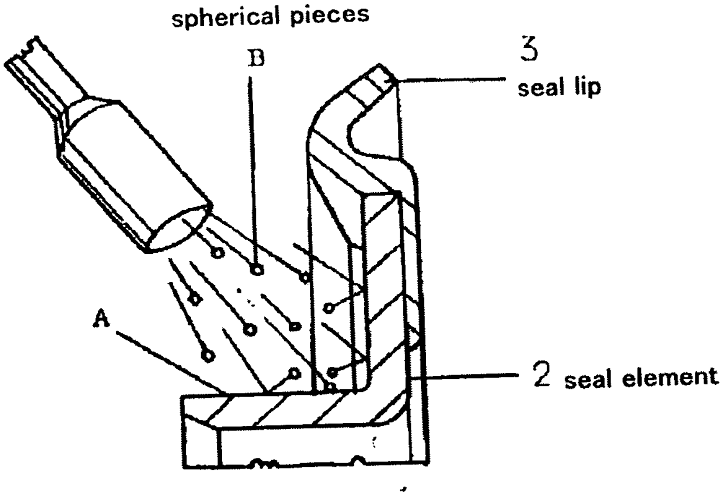


Fig. 2

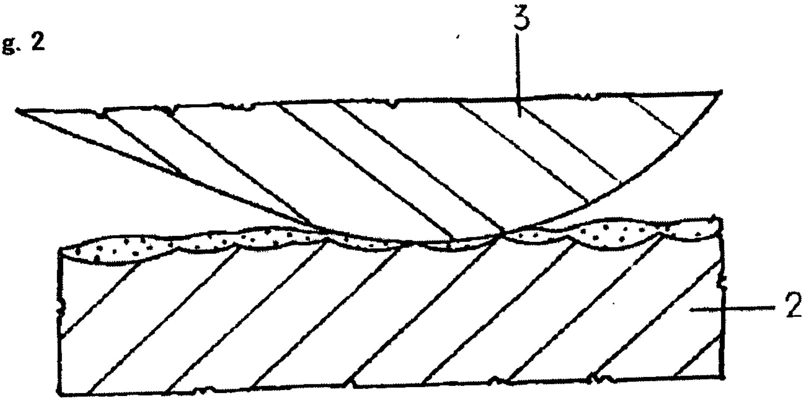
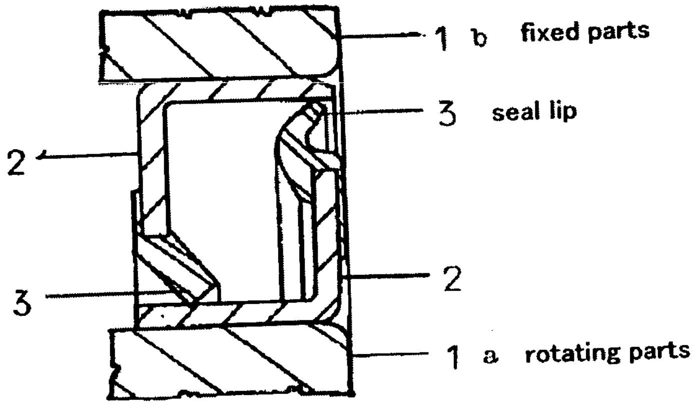


Fig. 3



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the counterpart member in the axial direction or in the radial direction to tightly seal the structure.

[Problems to be Solved by The Devisal]

However, the tight sealing capability of said seal lip 3 is largely affected by the slide surface A of the tight seal element 2 being in slide contact with said seal lip 3. When the surface roughness of the slide surface A is too small, an oil film as a lubricating agent is hardly formed so that heat is generated due to the rotating friction to harden or stick the seal lip, resulting in imperfect sealing. Contrary to this, when the surface roughness of the slide surface A is too large, there are other drawbacks such as the leakage of the lubricating agent, the acceleration of the wear of the seal lip 3 and so forth.

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In the case where a tight seal element is assembled by combining tight seal elements 2 each of which is provided with a slide surface A having such a rugged structure, there are formed a number of appropriate clearance locations in the surface to be come into contact with the seal lip 3 as illustrated in Fig. 2 and therefore, when driving with the tight seal device in use, a proper quantity of a lubricating agent tends to linger in the vicinity of and the bottom of the rugged structure in the form of a film to realize a balanced fitness and meet the clashing requirements, i.e., a good sliding performance and a tight sealing structure.

[EMBODIMENTS]

By means of the present devisal, it is possible to provide a desired roughness at high throughput by adjusting the degree of hardness, the size, the particle amount and the spraying period of spherical pieces B to be sprayed. Also, in the case where a plurality of seal lips 3 are combined with their tight seal elements 2 and 2' which come into contact with each other as illustrated in Fig. 3, a furthermore improved tight sealing capability can be achieved by giving the rugged surface treatment to

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A ...slide surface, B ...spherical pieces,

1a ... rotating parts, 1b ... fixed parts, 2 ... tight seal element, 3 ... seal lip

Applicant for a utility model registration:
Uchiyama Manufacturing Corp.

Fig. 1

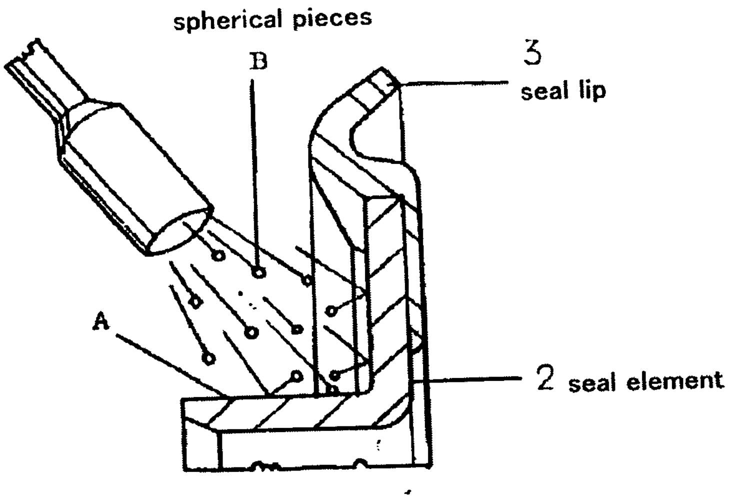


Fig. 2

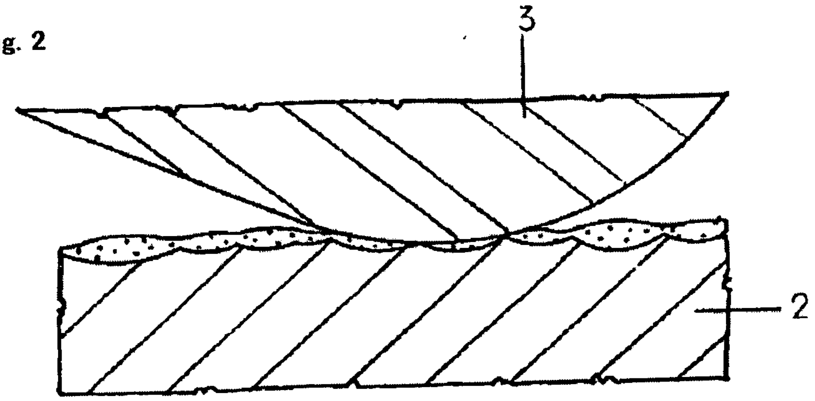
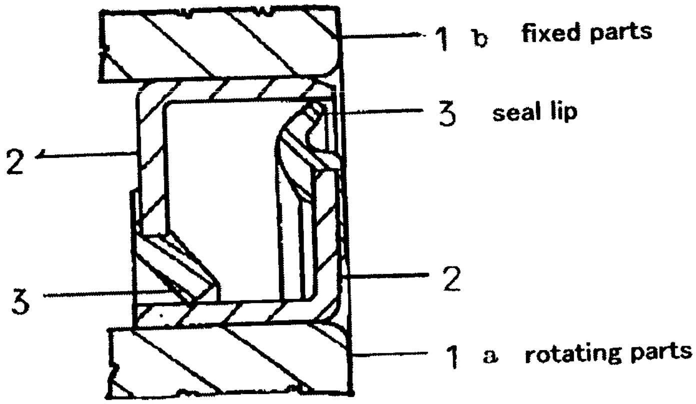


Fig. 3



Applicant for a utility model registration:
Uchiyama Manufacturing Corp.

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(54) Title of the Devisal; TIGHT SEAL DEVICE
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1. TITLE OF THE DEVISAL

Tight Seal Device

2. Scope of Utility Model Claims:

A tight seal device comprising a combination of a plurality of the tight seal elements 2 and 2' which are fitted to and mounted on a rotating parts 1a and a fixed parts 1b, the tight seal device being characterized in that said tight seal element 2 is provided with a seal lip 3 and let come into sliding contact with the opposed tight seal element 2' and that a rugged surface is formed by spraying spherical pieces B to a slide surface A which is to come into contact with this seal lip 3.

3. Detailed Description of The Devisal

[Industrial Field of Application]

The present devisal is related to the improvement of tight sealing capability of a tight seal device, and specifically related to the improvement of a profile for improving the slide performance and the tight sealing endurance of a tight seal device.

[Prior Art Technique]

In the prior art technique, tight seal devices have been developed and implemented in which a plurality of tight seal elements are combined with seal lips of a resilient member provided inside and outside thereof. So far, it has been known that a sealing action is enabled by the direct contact of said seal lip with a tight seal element of the opposition side whose surface condition is relatively stable.

Specifically explaining with reference to a drawing, this structure is implemented by combining tight seal elements 2 made of a metal and the like in order that a counterpart member thereof are arranged opposed to each other as illustrated in Fig. 1 to provide a combination type tight seal structure, which has been generally utilized, in which a seal lip 3 is arranged in contact with

the counterpart member in the axial direction or in the radial direction to tightly seal the structure.

[Problems to be Solved by The Devisal]

However, the tight sealing capability of said seal lip 3 is largely affected by the slide surface A of the tight seal element 2 being in slide contact with said seal lip 3. When the surface roughness of the slide surface A is too small, an oil film as a lubricating agent is hardly formed so that heat is generated due to the rotating friction to harden or stick the seal lip, resulting in imperfect sealing. Contrary to this, when the surface roughness of the slide surface A is too large, there are other drawbacks such as the leakage of the lubricating agent, the acceleration of the wear of the seal lip 3 and so forth.

Namely, in order to secure a tight sealing capability, it is needed to have an appropriate roughness of the slide surface A being in contact with the seal lip 3 to provide a clearance within a certain range. For example, the roughness as needed is 0.7S to 3.0S or thereabout in maximum roughness Rmax in the case of a seal for rotating motion, and 0.5S to 1.7S in the case of a seal for reciprocating motion, as most preferable ranges for the purpose of tight sealing. Accordingly, it is of primary importance to provide the slide surface A of a tight seal device with an appropriate roughness on which an proper oil film is surely formed and therefore a tight sealing power is maintained for a long period.

It is therefore an object of the present devisal to provide a tight seal device having a high tight sealing capability and a high mass-productivity.

[Measures to Solve the Problems]

The present devisal is characterized by a tight seal device comprising a combination of a plurality of the tight seal elements 2 and 2' which are fitted to and mounted on a rotating parts 1a and a fixed parts 1b, in which said tight seal element 2 is provided with a seal lip 3 and let

come into sliding contact with the opposed tight seal element 2' and that a rugged surface is formed by spraying spherical pieces B to a slide surface A which is to come into contact with this seal lip 3.

[Action]

The following excellent action was obtained by the above described structure.

Namely, as illustrated in Fig. 1, when spherical pieces B having an appropriate grain size are sprayed to a slide surface A to be arranged in contact with the seal lip 3, each of the spherical pieces B collides with the surface thereof, and then the surface film of said slide surface A is gradually broken due to this bombardment to form a rugged structure.

In the case where a tight seal element is assembled by combining tight seal elements 2 each of which is provided with a slide surface A having such a rugged structure, there are formed a number of appropriate clearance locations in the surface to be come into contact with the seal lip 3 as illustrated in Fig. 2 and therefore, when driving with the tight seal device in use, a proper quantity of a lubricating agent tends to linger in the vicinity of and the bottom of the rugged structure in the form of a film to realize a balanced fitness and meet the clashing requirements, i.e., a good sliding performance and a tight sealing structure.

[EMBODIMENTS]

By means of the present devisal, it is possible to provide a desired roughness at high throughput by adjusting the degree of hardness, the size, the particle amount and the spraying period of spherical pieces B to be sprayed. Also, in the case where a plurality of seal lips 3 are combined with their tight seal elements 2 and 2' which come into contact with each other as illustrated in Fig. 3, a furthermore improved tight sealing capability can be achieved by giving the rugged surface treatment to

both slide surfaces A of the plurality of the tight seal elements 2 and 2' and combining them.

[Effects of the devisal]

The jet of this spherical pieces B is used to completely remove an adhesive layer for use in fixing the seal lip 3 made of a resilient member and therefore it is possible to form a surface suitable for tight sealing free from the adhesive layer. Also, the abrasion resistance is improved while the metallic crystals at the surface of the tight seal element 2 made of a metal are finely grained to achieve a high degree of hardness by the bombardment during the particle blast.

Since the slide surface A provided with said rugged structure serves to maintain a lubricating agent thereon and greatly lessen the water-shedding quality, it is possible to constantly provide a lubricant for the surface and suitably perform the lubrication of the slide mechanism.

4. Brief Description of Drawings:

Fig. 1 is a cross sectional view showing an embodiment of the tight seal device in accordance with the present devisal. Fig. 2 is a partially expanded cross sectional view showing a sliding location of the tight seal device in accordance with the present devisal. Fig. 3 is a cross sectional view showing a tight seal device formed by combination.

A ...slide surface, B ...spherical pieces,

1a ... rotating parts, 1b ... fixed parts, 2 ... tight seal element, 3 ... seal lip

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Fig. 1

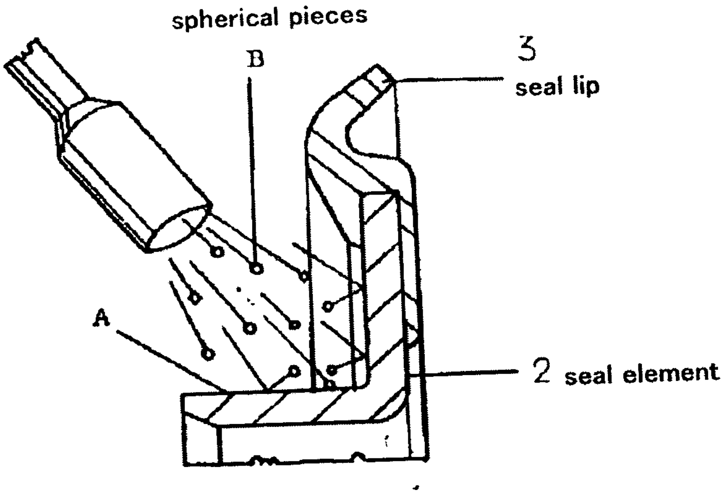


Fig. 2

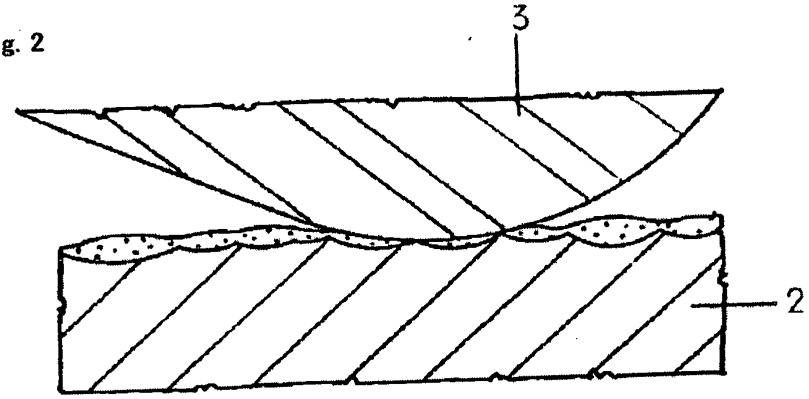
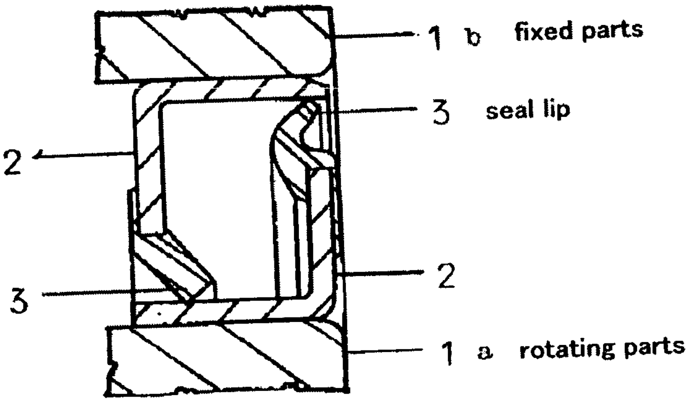


Fig. 3



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